

PATIENT EDUCATION MAGAZINE
WRITTEN BY DENTAL PROFESSIONALS

Dear DOCTOR[®]

DENTISTRY & ORAL HEALTH

MODERN FAMILY'S NOLAN GOULD

The bright young television star talks about his hit show, his triumph over cavities, and how modern dentistry saved his smile

SPECIAL SECTION INSIDE:

CHILDREN'S ORAL HEALTH

A must read for every parent!

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GRIND THEIR TEETH

CREATING IN-OFFICE
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DENTISTRY & ORAL HEALTH



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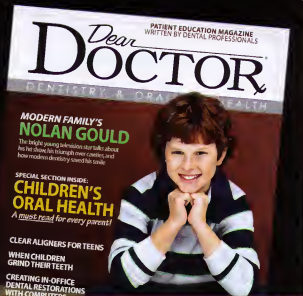
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"Children are the world's most valuable resource and its best hope for the future." John F. Kennedy

In this issue, which coincides with National Children's Dental Health Month, we celebrate our children with a special section highlighting topics in the changing life cycle of children's oral and dental health, from birth through adolescence to adulthood.



Dr. Mario A. Vilardi

The mouth is the conduit through which all food, healthy and unhealthy, passes. Poor dietary choices including excessive consumption of sugars and fat, and the absence of exercise, are habits that affect oral and systemic (general) health. Here's the impact of this: We live in an unusual age, when for the first time in the history of the United States childhood obesity is an epidemic, one that is impairing the physical and emotional health of our children, families, and society as a whole. It can become a chronic condition extending into adulthood and throughout a lifetime, increasing the risk for earlier onset of chronic diseases: diabetes, cardiovascular disease, oral disease and some cancers.

When children's oral health suffers, so does their ability to learn. As former Surgeon General Dr. David Satcher stated, "What amounts to a silent epidemic of dental and oral diseases is affecting (some) population groups. This burden of disease restricts activities in schools, work, and home, and often significantly diminishes the quality of life."

At every stage of life, eating a nutritious, balanced diet and staying physically active are essential for health and well-being. This is especially true for children and adolescents, who are developing the habits they will likely maintain throughout their lifetimes. As you will read in this issue, childhood is the time to encourage and instill healthy behaviors and habits. It is the responsibility of parents and healthcare professionals to shepherd our children, to make sure that they are nurtured and grow into the next generation's healthy mature adults.

We do so many things out of habit, by rote. A simple but surprising thing happened to one of us the other day that made this point. A certain *Dear Doctor* editor-in-chief would habitually take off his bike gloves, one finger at a time; when you're hot and sweaty this can take an eternity. Observing, his wife simply said, "Turn them inside out" — and off they popped in a second.

Children grow so quickly, seemingly their lives and ours pass in moments. Don't miss the opportunity to learn, change old habits for new — just "turn them inside out."

Sincerely,

Mario A. Vilardi, DMD
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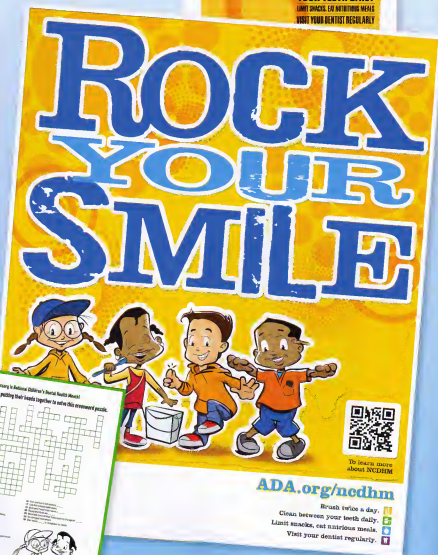
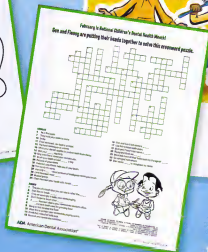
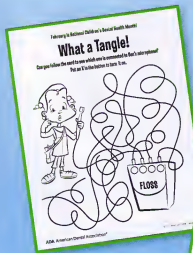
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Learning Healthy Habits Can Be Fun!

February is National Children's Dental Health Month, and *Dear Doctor* is pleased to take part in this important event with a special section on oral healthcare for kids of all ages. The American Dental Association (ADA) sponsors this month-long national health observance to highlight the importance of preventive care and of developing good habits at an early age for a lifetime of healthy teeth and gums.

This year's National Children's Dental Health Month theme is "Rock Your Smile," and the ADA website is offering fun activity sheets in English and Spanish that you can print out for your kids. Find them at <http://www.ada.org/ncdhm>



Download free games, activities, puzzles and educational materials by visiting www.ADA.org

Making A Difference For Children In Need

We would also like to call your attention to some charitable organizations that work year round to increase access to dental and surgical care here in the United States and across the globe. They all rely on donations of money, time and talent to restore the smiles of those most in need.



National Children's
Oral Health Foundation®
America's Toothfairy

Who they serve: American children at risk for developing severe tooth decay, the most common chronic childhood disease

What they believe: "Pediatric dental disease, more commonly known as severe tooth decay, has reached epidemic proportions. Millions of children are suffering from tooth decay, in pain so severe, it affects their ability to eat, sleep, and learn. Left untreated, tooth decay not only causes lifelong health complications for the afflicted; its social and economic consequences affect our entire nation."

What they do: Support a national affiliate network of nonprofit dental centers, university dental schools, community clinics and volunteer dental professionals bringing oral health services to the children who need it most. Since 2006, NCOHF has distributed over \$9 million in direct funding, as well as donated dental products and technical resources, to the affiliate network. In just over five years, NCOHF affiliates have provided preventive, restorative and educational oral health services to more than 1 million children.

Learn how to help: visit ncohf.org

Operation  Smile

Who they serve: Children around the world born with cleft lip, cleft palate and other facial deformities

What they believe: "All children deserve to live their lives with dignity. And for those suffering from cleft lip, cleft palate or other facial deformities, dignity begins with a smile. Driven by our universal compassion for children, we work worldwide to repair childhood facial deformities by delivering safe, effective surgical care directly to patients. The global partnerships we create, the knowledge we share and the infrastructure we build leave a legacy that lives well beyond our medical missions, making a lasting difference in our world."

What they do: Provide free surgeries to repair facial deformities. Since 1982, Operation Smile — through the help of dedicated medical volunteers — has provided more than 2 million patient evaluations and over 200,000 free surgeries for children and young adults in more than 60 countries.

Learn how to help: visit operationsmile.org



ADA American
Dental
Association*

Who they serve: American children who lack access to dental care

What they believe: "We are the professional and industry alliance dedicated to the elimination of cavities in U.S. five year olds by 2020 through our ability to nurture, empower and showcase community based prevention and care programs."

What they do: The American Dental Association (ADA) holds an annual Give Kids A Smile Day on the first Friday in February. The program mobilizes tens of thousands of dental professionals to provide a day of free oral health services to nearly 400,000 kids. More recently, the ADA has expanded the one-day event into a year-round effort.

Learn how to help: visit ADA.org/givekidsasmile.aspx



Oral
Health
America

Who they serve: Americans of all ages

What they believe: "Oral Health America's programs increase access to care and education, and encourage policies that bring healthy mouths to life. Our vision is a future free of oral disease and pain."

What they do: Provide preventive dental care such as fluoride treatments and sealants to children around the country; educate the public about the importance of oral health; advocate for greater access to dental care. In 2010, Oral Health America served 310,000 children lacking routine access to dental care in 27 states, and distributed 500,000 units of donated dental products.

Learn how to help: visit oralhealthamerica.org



Who they serve: People in developing countries in need of reconstructive surgery

What they believe: "ReSurge envisions a world in which no human being suffers physically or emotionally from a repairable congenital deformity or injury. It restores the dreams of those with deformities and injuries, and impacts the world by renewing the health of thousands of children and adults each year so they can go to school, provide for their families and contribute to society."

What they do: Provide free reconstructive surgeries for the poor, train doctors and build year-round medical access in underserved areas. ReSurge operates in 13 African, Asian and Latin American countries, treating children and adults with clefts, disabling burns, hand traumas and other disfigurements and injuries.

Learn how to help: visit resurge.org

You can stop the tears from falling.



Millions of children in the U.S.
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tooth decay, in pain so severe,
they are unable to eat, sleep or
concentrate in school.

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There's no need to wait until your baby actually has teeth to lay the foundations for good oral or general health. In fact, good nutrition and oral hygiene can start right away. It is up to you to develop the routines that will help protect your child from tooth decay and other oral health problems. So let's get started!

1. Start Proper Oral Hygiene Habits ASAP

Gently clean your infant's gums and newly erupting first teeth after each feeding with a water-soaked gauze pad to clean around the teeth and gums.

2. Brush With Care


When your baby's teeth begin to erupt, brush them gently with a small, soft-bristled toothbrush using no more than a thin smear of fluoridated toothpaste.

3. Teach Your Children

When your child turns 2, you can begin to teach your child proper brushing techniques with no more than a pea-sized amount of fluoridated toothpaste. You should follow up their efforts by gently brushing the teeth again. Modeling correct technique is important. When your child is about 6 years old, he/she should be developing the dexterity to do it alone. You can then introduce flossing.

4. Check Your Water

Determine if the water supply that serves your home is fluoridated. If it is not, discuss supplement options with your dentist. Keep in mind that toothpastes and various foods may also contain fluoride.



Did you know?

A baby's primary teeth begin forming before birth – at about the sixth week of pregnancy, and begin mineralizing at around the third to fourth month of pregnancy. To ensure proper dental development, the mother's diet must be adequate in all nutrients, especially calcium, phosphorous, and protein.

5. Fight Baby Bottle Tooth Decay

Don't let your child go to sleep with a pacifier or bottle filled with anything but water. When teeth are frequently exposed to sugar-containing fluids (including breast milk and formula) for long periods, the potential for decay increases dramatically.

6. Avoid Sugar

Understand that if your child ingests sugars, it will take the saliva a minimum of 30 minutes to neutralize the acidity that is created by decay-producing bacteria. A sugary snack every hour can mean your child's mouth is always acid, increasing the chances for tooth decay.

7. Make a Dental Appointment

Your child should see a dentist around the time of his/her first birthday and then regularly thereafter. It is important to establish a dental home. Your pediatric or general dentist will teach you how to prevent dental disease, check for cavities in the primary teeth and watch for developmental problems, and set a positive precedent for future visits.

8. Prevent Cavities

Ask your dentist about dental sealants and fluoride applications to protect your child's teeth. Sealants can prevent food from getting stuck in the tiny grooves on the chewing surfaces and topical fluoride will strengthen the enamel against decay.

9. Keep Your Cool

If you feel anxious about a visit to a dental professional, try not to convey these feelings to your child. This is very important for emotional well-being. Encourage your child to discuss any fears he/she might have about visiting a dentist, but don't put any new fears into his/her head. It is a good rule of thumb not to mention the words "hurt" or "pain" as it raises a possibility he/she might not have thought of.

10. Childproof Your Home

Research has shown that children under age 7 sustain over half of the dental injuries to their primary (baby) teeth playing in close proximity to home furniture.

NOLAN GOULD

THE BRIGHT YOUNG *MODERN FAMILY* STAR TALKS ABOUT HIS HIT SHOW, HIS TRIUMPH OVER CAVITIES, AND HOW MODERN DENTISTRY SAVED HIS SMILE

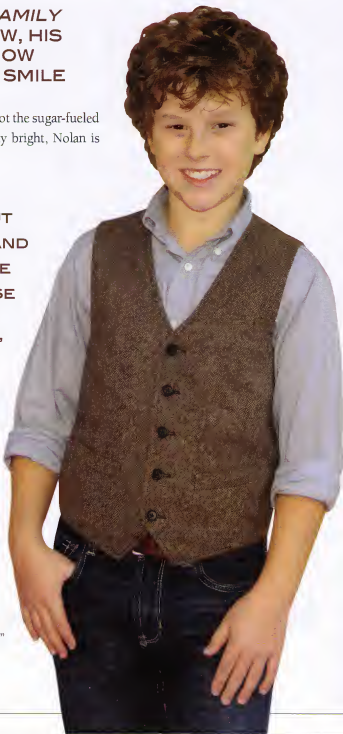
Talk to Nolan Gould for only a minute and you'll realize he's not the sugar-fueled space cadet he plays on TV. Articulate, witty and undeniably bright, Nolan is smart about a lot of things — including his oral health.

"I want to put dental care and oral hygiene first because it's really important," the 13-year-old actor recently told *Dear Doctor*. "Especially because I have to talk to people and smile a lot, I want to have a nice, clean mouth and nice-smelling breath."

**"I WANT TO PUT
DENTAL CARE AND
ORAL HYGIENE
FIRST BECAUSE
IT'S REALLY
IMPORTANT,"**

Nolan gives television viewers a reason to smile each week as the goofy, mentally-challenged Luke Dunphy on the acclaimed ABC comedy *Modern Family*. He's so convincing at playing dumb, this card-carrying member of Mensa (the international high IQ club) often takes people by surprise.

"They always think that I'm dumb in real life," Nolan said with a laugh. "Then they go onto my twitter and read all my tweets. And they're like, hey, this kid isn't dumb, he's making really smart tweets. And they're always shocked. They're like, 'I can't believe you're not dumb, I always thought you were. So you don't run into screen doors, you don't run into walls?' And I'm like, no, that's just the character!"



FOR THE PAST THREE
SEASONS, NOLAN HAS BEEN
FEATURED ON THE SHOW
THAT VIRTUALLY SWEEPED THE
LAST EMMY AWARDS.
"I JUST FEEL SO BLESSED, SO
GRATEFUL," SAID NOLAN.



At 13, Nolan is already a veteran actor, having followed his older brother Aidan into acting classes when he was only 3. The boys' mother was looking for a challenge for Aidan, who was 5 at the time.

"My brother was really advanced for his age," Nolan explained. "My mom wanted to find something that would entertain him because everything else was so easy for him. She heard about this theater program and she enrolled my brother in it. And I went along with him because I kind of had to, but I ended up enjoying it — we both did."

The two boys thrived on stage and loved hamming it up. "When people laughed, we just thought it was amazing," Nolan recalled. The boys soon started auditioning for print work and commercials.

The earliest job Nolan can remember is a modeling gig when he was 4 or 5 for a costume company. He was the little pirate on the package photo that showed what the costume would look like when worn. Some of those costume packages are still out there, Nolan said. "Every once in a while I'll be walking through a store and I'll see a costume and I'll be like, hey, who is that little kid on that? It looks very much like me. Wait — that is me!"

"THE MAJOR THING THAT I LOVE ABOUT ACTING IS JUST THE EXPERIENCE I GET TO HAVE," NOLAN GUSHED.

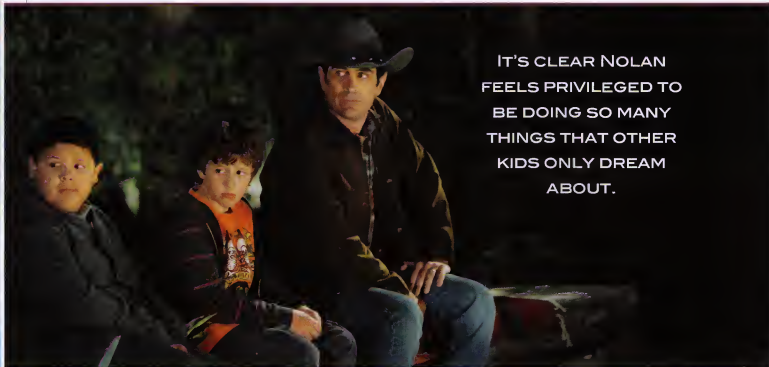
"I GET TO BE A NEW CHARACTER AND DO THINGS I WOULD NEVER DO."

With his father in the military, Nolan moved around a lot. The family was eventually transferred from Alabama to California — a lucky development for Nolan's career. The boys built up their acting résumés with parts in small student films as they auditioned for bigger things. And for the past three seasons, Nolan has starred on the show that virtually swept the last Emmy Awards.

"I couldn't believe that we won the first four awards of the night and then the last one," Nolan said of his show's success. "I just feel so blessed, so grateful."

As experienced in show business as Nolan already is, he does not appear at all jaded. In fact, it's clear he feels privileged to be doing so many things that other kids only dream about. He has filmed on location in Hawaii and Wyoming, and can even try on a completely different personality.

Copyright © 2010 ABC Studios/Rick Rowell



IT'S CLEAR NOLAN FEELS PRIVILEGED TO BE DOING SO MANY THINGS THAT OTHER KIDS ONLY DREAM ABOUT.

"The major thing that I love about acting is just the experience I get to have," Nolan gushed. "I get to be a new character and do things I would never do. Luke is the exact opposite of me. He thinks, hey, wouldn't it be fun to jump off the house with a blanket as a parachute? I think, that's gonna get you hurt, but Luke just goes for it. So I get to do a lot of fun things like take a pogo stick on a trampoline, or run into walls or screen doors."

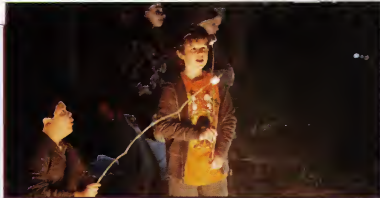
In one episode, Luke crashes through the Dunphy's screen door when he doesn't realize it's closed — something the family dog was able to figure out just moments before. Nolan said he does all of his own stunts and often has the bruises to show for it.

"When I was running into the screen door, the next day I ended up with so many bruises up and down my legs," he said. "Every time I do something like that, I usually end up with a headache. I think I did something mean to the writers, so now it's like, let's write ways for Nolan to hurt himself!"

But Nolan said he doesn't worry that much about accidents, on or off the set. "I drink a lot of milk, so I've got really strong bones," he boasted. "So when I fall, and usually people would break their arm, I'm fine." Besides, Nolan said, "If I broke an arm or something, they could always write it into the show. Luke's so crazy, he'd probably break things all the time!"

Of course, as Luke found out, walking into a screen door is one way to open it, and Nolan's portrayal of Luke has opened many doors for this talented young actor. He recently starred in the television thriller *Ghoul*, and will soon be seen in the feature film *The To-Do List*, starring Andy Samberg, Bill Hader and other comedy greats.

"It was really amazing but also kind of intimidating working with all those hilarious comedians," Nolan said. "I think there was one person from each comedy on TV, working on the movie. It's a pretty adult movie so my mom wouldn't let me read the script," he added.



Nolan credits his mom, Angela, with passing down her intelligence genes to her sons. "My mom really thinks things through and I think she's pretty smart," he said.

The theatrical genes, he said, come from his dad, Edwin. "He's such a ham, he's always so crazy, like when we're at parties and there's karaoke, of course he's up there singing some rock song from the eighties trying to be all cool," Nolan said.

Neither of Nolan's parents had any experience with show business before their sons became actors. And the adjustment to life as a show biz family has not always been easy, said Nolan.

"It was very difficult. The family had to make a lot of sacrifices," he said. "I work full time and we have all these different other things going on. And it's crazy. My dad has to take a lot of time off work to take my brother to auditions."

Still, it's a lifestyle that offers the family many rewards.

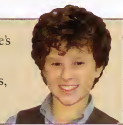
"Because we love acting so much, we're willing to make some sacrifices and use up some of our free time to go out and just live this experience," Nolan said.

When he isn't acting, Nolan is keeping up with an accelerated academic program, going camping with the Boy Scouts, even playing the stand-up bass. And he's looking forward to discovering what his teenage years will bring.

"I'm ready to be a teen," Nolan affirmed. "I don't think it will make a huge difference in my life, though. Hopefully I'm not going to have all that teenage angst like Haley and Alex do," he said, referring to his television siblings. "Hopefully I'll just remain a normal kid."

Q + A WITH NOLAN GOULD

Modern Family star Nolan Gould, 13, already knows a lot about keeping his teeth healthy. He's had oral surgery, orthodontics, and preventive dental care including fluoride applications, among other treatments. *Dear Doctor* asked Nolan to describe some of his dental experiences, which he did with characteristic intelligence and humor!



Have you ever worn braces?

Right now I have what are called Crozats. They're like removable braces — they're these little metal wirings that go around the back of your teeth and they kind of inter-loop between your teeth. You can remove them, which is really good for acting, especially because you can't see them. I can wear them 24/7 and nobody will ever notice.

What type of problem is your orthodontist trying to correct with these appliances?

My teeth used to be pretty messed up. I had two extra teeth when I was born. They hadn't come out (erupted) yet. And all the other teeth that were already there were starting to point backwards because it was getting so crowded in my mouth. They had to remove those two teeth, which was very scary for me at that time. I was around 8 or 9. I'm wearing these Crozats just to make sure that as new teeth come up, they don't get turned backwards again.

Have you ever had cavities?

No — I've never had a cavity in my life. I've always been really good about brushing my teeth and flossing. My brother and I have both never had cavities and we're trying to see who can go the longest without having cavities. It's like a competition between us. Hopefully neither of us will ever have cavities!

When did you start going to the dentist?

I started going to the dentist almost as a baby to get my teeth cleaned. And then at about the age of 7, that's when I started going to the orthodontist to get my teeth checked.

Has your dentist ever given you fluoride treatments or other cavity-prevention treatments such as sealants?

I do get fluoride treatments every six months when I get my teeth cleaned. I get the Creamsicle flavoring!

Did you get visits from the Tooth Fairy?

Ever since I was little, the Tooth Fairy came by to visit every time I lost a tooth. And I remember one year I got so upset because I put my tooth in a bowl once it got pulled out and my dad put the bowl in the dishwasher. And I freaked out and I thought that I wasn't going to get any money because the Tooth Fairy wouldn't find my tooth. So late that night, when I was asleep, my mom had to search through the dishwasher and finally found my tooth. And then she gave me an extra 10 cents just because I was so sad 'cause I thought I'd lost my tooth.

Now recently I got one of my teeth pulled out. It was really hard to pull out because it had this really long root. It took so long to pull it out. I didn't want my mom to do it 'cause it hurt so bad. I'm like, every time you try to pull it and don't get it out, I'm going to charge you an extra dollar!

Your mom was actually pulling it out herself?

Yes — I tried six times on my own and then my mom tried five times. Then we finally gave up after all these different techniques and she tied a piece of dental floss to my tooth, and then I lied down and she just pulled up and the tooth went flying out. I got an extra five dollars for that!

Do you ever wear a mouthguard when playing sports?

When I used to take karate, I used to have to wear a mouthguard just in case I got kicked or punched in the face.

Is going to the dentist easy for you now, or do you get nervous?

I don't get nervous. Most of the treatments that we're doing now are pretty easy — the fluoride treatments, regular cleanings, and tightening of my Crozats.

Does your *Modern Family* character, Luke, take good care of his teeth?

I don't think Luke maintains good oral hygiene. He's so distracted by everything going on, he forgets to brush his teeth. He only does it when his mom asks him to do it.

So that's another way in which you and your character are very different.

Yeah. Plus, I don't really get hyper with sugar and Luke does.

"I STARTED GOING TO THE DENTIST ALMOST AS A BABY TO GET MY TEETH CLEANED. AND THEN AT ABOUT THE AGE OF 7, THAT'S WHEN I STARTED GOING TO THE ORTHODONTIST TO GET MY TEETH CHECKED."



Dentistry & Oral Health FOR CHILDREN

Guiding your child's oral health from
birth through adolescence

Every stage of life is unique, and nowhere is this more apparent than in the journey we all take in “becoming us” — our adult selves. The process of growth and development is complex and shrouded in magnificent mystery. As time and science unveil the mysteries of growth, it is the responsibility of parents and healthcare professionals to shepherd our children, to make sure that they are nurtured and grow into the next generation's healthy mature adults.

Monitoring growth and development, preventing and intercepting disease along this road, is the mission of pediatric dentistry. This dental specialty strives to ensure the oral health of infants and children through adolescence to the completion of growth — including children with special healthcare needs. Children's needs extend beyond oral and dental health to include general health, for they are inseparable and interconnected. Healthy growth and development lays the foundation for the rest of one's life, both physically and emotionally.

We will review the topics involved in the changing life cycle of children's oral and dental health, from birth through adolescence to adulthood. It is a real metamorphosis.



Healthy growth and development lays the foundation for the rest of one's life, both physically and emotionally.



PH Scale

Acids below pH 5.5 cause tooth decay and tooth erosion

<p>Healthy Range</p> <p>Acids below pH 5.5 cause tooth decay</p>	pH = 14	Liquid Drain Cleaner
	pH = 13	Bleaches, Over Cleaner
	pH = 12	Soapy Water
	pH = 11	Ammonia Solution
	pH = 10	Great Salt Lake, Asparagus, Milk of Magnesia
	pH = 9	Baking Soda, Melons
	pH = 8	Sea Water
	pH = 7	Drinking Water
	pH = 6	Saliva, Dairy
	pH = 5	Black Coffee
	pH = 4	Tomato Juice, Alcohol, Sports Drinks
	pH = 3	Grapefruit, Orange Juice, Sodas
	pH = 2	Lemon Juice, Gastric Acid Vinegar
	pH = 1	Stomach Acid
	pH = 0	Battery Acid, Strong Hydrofluoric Acid



THE MORE THINGS CHANGE, THE MORE THEY... REALLY CHANGE

The Surgeon General of the United States has stated, "You can't be healthy without oral health." And you can't have good oral health without good nutrition. Mother and child embark on the journey of new life together, which begins with the mother's healthy diet and nutrition for her developing baby. This changes into meeting the needs of the growing child as a separate entity, and again as the child grows and becomes independent. Nutrition affects growth and development, and of course the mouth is the conduit through which it all takes place. We need good nutrition and dietary practices throughout life for the formation, development and continued health of our oral tissues and structures, as well as those of the rest of our body.

It's not only about what's healthy that goes into your child's mouth, it's also about what's unhealthy. The relationship between tooth decay and sugars, refined carbohydrates (or added sugars), consumed throughout the day is well known. Neutral pH is 7 (pH is a measure of a fluid's acidity at 1-7, and alkalinity at 7-14). Tooth decay begins at pH 5.5, in the surfaces of the teeth called pits and fissures (**the nooks and crannies on the biting surfaces**) and at the points where adjacent teeth contact each other — all protected areas that are difficult to clean.

What is not so well known is the impact of sports drinks and sodas that have low pH values in the 2-4 range (read that as high acidity). They are causing an increased incidence of enamel erosion, which can affect the whole tooth surface. Gastro Esophageal Reflux Disease (GERD), a condition caused by acid regurgitation from the gut (pH 1, severe acidity), is a primary cause of tooth erosion, a literal dissolution of the protective enamel, and underlying dentin in severe cases. Erosion caused by GERD can be seen in early childhood and on erupting permanent teeth, but it may also abate. It is not uncommon to be able to tell when tooth erosion occurred by the teeth affected, and by its severity. Similarly the psychological stress-related conditions of bulimia ("bu"- ox-like; "limos"- ravenous hunger) and anorexia ("an"- without; "orexis"- appetite or desire) are associated with bouts of vomiting, which can result in severe acid-induced tooth damage, especially in teens.

FLUORIDE AND DENTAL HEALTH

Described as "one of the ten most important public health measures of the 20th century" by the Centers for Disease Control and Prevention, fluoride in the right place, at the right time, and in the right amount has a 50-year scientific research and safety record proving that it makes teeth stronger and more resistant to dental decay. When it is added to public water supplies at the current recommended levels of 0.7ppm (parts per million), it is incorporated into developing tooth structure. Almost 200 million Americans are drinking fluoridated water, which also means that 100 million do not have the advantage of this amazingly safe and cost-effective health benefit.

Fluoride can also be applied topically in the form of toothpaste, rinses, varnishes, sealants and by other means — which allows it to be incorporated into the enamel surfaces of the teeth with similar effect. When is enough enough, or even too much of a good thing? We answer this question and more in our consultation on supplemental fluoride and infant formula.



New!

NIMBY®



A Great Toothbrush For Kids!

Introducing NIMBY...the children's toothbrush from Nimbus Dental. The same soft, effective bristle design that Nimbus is famous for is also incorporated into the NIMBY Toothbrush.

Children have delicate gums so give them a toothbrush designed to be gentle yet effective!

Available in 4
fun colors!



nimbus®
for kids

Designed
for children
ages 2 to 6



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or call 866.646.2871



Kissing your infant on the lips transfers your bacteria to your baby, which has the potential to cause tooth decay.

HEALTHY AND UNHEALTHY HABITS

Clearly, physical growth and development, which occur before our very eyes, are accompanied by rapid change. Emotional development, brain function and learning are part and parcel of growth, and learning is a fundamental part of healthy lifelong habit formation. The Age One Dental Visit — a visit to your pediatric dentist as soon as a baby's first teeth appear — is an integral part of these processes. It is vitally important to establishing a relationship and a dental home. And you may well need it as your baby starts teething, which can be a trying time, not only for your baby, but for you too. Our excellent consultation on teething may be a sleep-saver for both your baby and you. If teeth aren't problems when they're coming in, they may be problems when they're going, as you will doubtless learn as you read on.



Learning and establishing healthy habits is a fundamental platform upon which lifelong oral health is based. Age-appropriate oral hygiene aids and products are critically important to habit formation, especially for children with special needs. All children should learn to remove the bacterial biofilm that daily collects on teeth and is a major cause of tooth decay and gum disease. Good oral hygiene is also about preventing transmission of decay-causing bacteria from parents and caregivers to children — your child's oral health is therefore related to your own. Sharing eating utensils with your baby or licking pacifiers to clean them encourages transmission of bacteria. And speaking of pacifiers, it can become important for your child's dental health to correct behaviors that are initially comforting — including thumb and finger sucking and baby bottles — if they go on too long.

In a different vein, adolescent and teenage behaviors can have even more harmful consequences. Tongue or lip bolts and other piercings, chewing tobacco and other harmful behaviors are never healthy and can have both psychological as well as physical consequences.

A NEW SLANT ON AN OLD DISEASE — TOOTH DECAY

Why do some children and adults get tooth decay and others don't? Tooth decay, believe it or not, is an infectious disease and best understood by picturing it as a balance between pathogenic (disease causing) and protective (health promoting) factors. Each individual has his/her own balance. **BAD** Pathogenic factors include Bad bacteria, the Absence of healthy saliva (and its ability to neutralize acid), and poor Dietary habits. **SAFE** Protective factors include healthy Salivary function and Sealants (to seal the areas most likely to decay), the use of Antibacterial agents, topical Fluoride, and a healthy Effective diet.

Today many dentists use a system known as Caries Management By Risk Assessment (CAMBRA) to help figure out an individual's risk for developing this disease. There are special and separate assessments for the newborn-to-6-year-olds and for adults, catering to the needs of these groupings, and those in transition.



THE CARIES BALANCE

Disease Causing Factors

BAD disease-causing factors include the following:

Bad Bacteria – Acid-producing Bad bacteria

Absence of Saliva – The Absence of healthy salivary function (for example, dry mouth)

Dietary Habits (Poor) – Frequent sugars and acids lead to demineralization and a low pH allowing bad bacteria to thrive and starting the decay process

Protective Factors

SAFE protective factors include the following:

Saliva and Sealants – Saliva neutralizes acid encouraging good bacteria to thrive and aids remineralization. Sealants seal the chewing surfaces of the teeth most likely to decay.

Antimicrobials – Helping rid the bad bacteria and establish health-promoting bacteria

Fluoride – Strengthening the tooth surfaces against demineralization promoting remineralization

Effective Diet – Consuming a healthy diet



Tooth Decay



Healthy Tooth

An inside look at a 4-year-old's developing jaws and teeth

The permanent tooth buds are located below the baby teeth and are starting to form. As they erupt, they remove the roots of the baby teeth.



Permanent Teeth

- ① Central Incisors
- ② Lateral Incisors
- ③ Canines (Cuspids)
- ④ First Premolars (Bicuspids)
- ⑤ Second Premolars (Bicuspids)
- ⑥ First Molars
- ⑦ Second Molars

Note: Wisdom teeth have not yet started to form (calcify).

TRANSITIONS

Shedding the vestiges of childhood is like shedding leaves from a tree. One may argue that nothing typifies growth and change better than losing deciduous (*baby*) teeth, but did you know that the deciduous teeth actually begin their development at about the sixth week of life in the womb, and the permanent teeth begin to develop while the baby teeth are in use? As the jaws grow, the crowns of the new teeth actually push against the roots of the baby teeth, causing them to resorb, or melt away, so that the adult (*permanent*) teeth can take their place.

Often referred to initially as the “ugly duckling” phase, with teeth seemingly going in every direction and space, this is accompanied by tremendous physical and emotional changes. Hormones are raging, acne is exploding, and more. But as the storms finally cease, your baby emerges as a young (almost) fully fledged adult — cygnet to ugly duckling, to swan!

As jaw growth occurs in concert with the emergence of adult teeth, malocclusion (“mal” – bad; “occlusion” – bite) can become evident, or if already present it can get worse.

Early detection of orthodontic problems (“ortho” – straight; “dont” – tooth), even as young as 7 years old (as you will note in our Nolan Gould interview), may reveal the need for early or interceptive orthodontic treatment. This can help direct proper jaw growth, eliminating or simplifying the need for later treatment.

The options for orthodontic treatment today for teens have improved as dramatically as the results they can achieve. Clear aligner technology — custom-made computer-generated “trays” that fit over the teeth precisely, with each tray varying incrementally from its predecessor — ultimately result in a new and functional smile. Today this can prevent the need for traditional braces, the ones that look like mini train tracks, through which special “arch” wires are threaded. As the wires unravel, they leave the teeth in an ideal new position. Which method is right for your teen? This will depend upon your child's diagnosis and malocclusion, and the skills and experience of the orthodontist, or dentist with additional training in orthodontic techniques. Read more in our article on clear aligners for teens.

When Your Child's Teeth Come And Go

Use this helpful resource to make sure your child's oral health and development are normal

Age of Tooth Eruption (Baby Teeth)

① Lower Central Incisors	6-10 mos.
② Upper Central Incisors	8-12 mos.
③ Upper Lateral Incisors	9-13 mos.
④ Lower Lateral Incisors	10-16 mos.
⑤ Upper First Molars	13-19 mos.
⑥ Lower First Molars	14-18 mos.
⑦ Upper Canines (Cuspids)	16-22 mos.
⑧ Lower Canines (Cuspids)	17-23 mos.
⑨ Lower Second Molars	23-31 mos.
⑩ Upper Second Molars	25-33 mos.

Age of Tooth Loss (Baby Teeth)

① Lower Central Incisors	6-7 yrs.
② Upper Central Incisors	6-7 yrs.
③ Upper Lateral Incisors	7-8 yrs.
④ Lower Lateral Incisors	7-8 yrs.
⑤ Upper First Molars	9-11 yrs.
⑥ Lower First Molars	9-11 yrs.
⑦ Upper Canines (Cuspids)	9-12 yrs.
⑧ Lower Canines (Cuspids)	9-12 yrs.
⑨ Lower Second Molars	10-12 yrs.
⑩ Upper Second Molars	10-12 yrs.



DID YOU KNOW?

- Each jaw should have 10 baby teeth
- There should be spaces between your baby's front teeth
- Your baby's teeth will appear in pairs

TRAUMA COMES IN MANY FORMS

Missing teeth and trauma to teeth are common problems of childhood and adolescence. Congenitally missing teeth ("con" – together with; "genital" – birth) are not infrequent especially in the upper lateral incisor position (the ones right next to the upper front teeth). Teeth lost to advanced decay or trauma also present problems. The baby teeth act as guides for the permanent successors, and when they are lost, movement of the remaining teeth into their spaces disrupts this function. If the spaces are not maintained with retainer-like appliances, it is almost assured that malocclusion will result.

Losing teeth has a great effect on the remaining bone. See our consultation on tooth removal for orthodontic reasons. More information is provided on innovative surgical techniques in use today for bone conservation and regeneration, and to prevent recession of gum tissues following orthodontics.



Did you know that the most common injury in children and adolescents is trauma to upper front teeth? In our last special issue on "Sports Injuries and Dentistry," we covered many aspects of what to do, when to do it, and who should carry out treatment. We also published a field-side guide for treatment of dental injuries, and how to prevent them in the form of custom-made mouthguards.

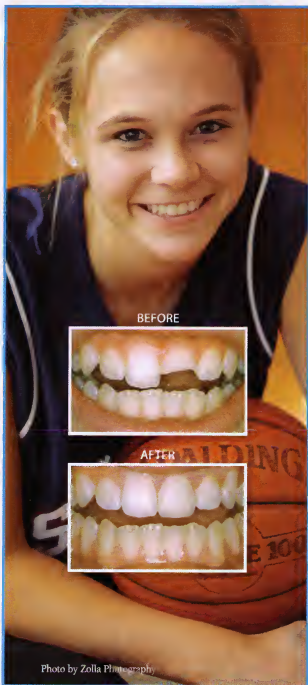


Photo by Zolla Photography

Many dental injuries resulting in chips and minor fractures to front teeth can be temporarily fixed with today's tooth-colored restorative bonding materials. They perform an excellent service until the individual has completed facial growth, changed lifestyle and is no longer as vulnerable to dental injury. Then more permanent restorations can be placed, such as porcelain veneers or crowns.

Impacted wisdom teeth, trapped in poor positions, can cause damage to neighboring healthy teeth, bone and gum tissue in addition to other vital structures such as blood vessels and nerves.



For more severe injuries that have resulted in tooth loss, and for permanent replacement of missing teeth, dental implants are the state-of-the-art tooth replacement systems, provided growth of the face and jaws is complete. Modern dental implants have revolutionized dentistry; they stabilize bone, and can also be used to facilitate orthodontic tooth movement in the form of Temporary Anchorage Devices (TADs).



DOES IT END WITH WISDOM TEETH?

Perhaps in the end, it is with the emergence of the wisdom teeth that maturity is finally signified. Wisdom teeth appear between ages 17 and 25. Their name, interestingly, is associated with a final coming of age across cultures — the attainment of a certain (if not romanticized) wisdom. Strangely enough, modern science has recently confirmed that this is the age when the brain reaches maturity.

But does it end with wisdom teeth? Alas not, for while wisdom teeth may signify the true end of childhood and adolescence, they also usher in the hopefully long era of adulthood, and, like adulthood, wisdom teeth come with their own set of problems. Impacted wisdom teeth, trapped in poor positions, can cause damage to neighboring healthy teeth, bone and gum tissue in addition to other vital structures such as blood vessels and nerves. Early detection of problems and their early removal, before roots form, can definitely be “a stitch in time.”

AND IN THE END

And in the end, this whirlwind overview of oral health and dentistry for children is really just a beginning and a guide, to what will hopefully set your child on the best road, not only to lifelong oral health, but also to general and emotional health — and well-being.

Tooth Development And Infant Formula

Monitoring Fluoride In Your Child's First Year

A Consultation with Dr. Jessica Y. Lee

✉ Tooth Development And Infant Formula?

From: Sue (Maine)

To: Consultations@deardocor.com

Subject: Tooth Development And Infant Formula?

Dear Doctor,
I mix my four-month-old baby's powdered formula with our tap water, which I think is fluoridated. Is this okay?

Dear Sue,

Good question. While it's important for your baby to get enough fluoride for strong tooth development and decay prevention, too much of this important mineral can lead to a condition called "enamel fluorosis." This can cause a mottled or streaked appearance of your child's permanent (adult) teeth. In mild cases, the streaks or patches are white in color and may be barely noticeable. In more severe cases, a darker stain with a pitted texture can be evident. It is a cosmetic problem and not a sign of disease, but the staining is permanent and may eventually require cosmetic treatment in severe cases.

How does fluorosis occur? As both deciduous (baby) and permanent teeth are developing in the jaws, fluoride from water and the diet becomes incorporated into the tooth structure. This helps the teeth become strong and more resistant to decay. Infants and toddlers are exposed to fluoride in various ways — mostly from the liquids they drink. Many parents like you feed their babies powdered formula reconstituted with drinking water. Fluoride is



naturally present in water to various degrees, and most municipal water systems add it to the water supply to promote good dental health.

Bottled water, juice and other beverages may also contain fluoride — in varying amounts. The trouble is, it's hard to know how much; there is no labeling requirement unless the fluoride has been specifically added. And fluoride intake is cumulative. Finally, many dental products such as toothpaste contain fluoride and very young children tend to swallow toothpaste rather than spit it out. That's why the American Academy of Pediatric Dentistry recommends just a small "smear" of fluoridated toothpaste for children under 2, and that children 2-6 use only a pea-sized amount when brushing, and no more than twice a day.

Fluoride use is mainly a concern up until the age of about 9, when the enamel of the permanent teeth has developed. You might be tempted to leave out fluoride entirely early on. That would be a big mistake. Tooth decay is the most common chronic disease of childhood and can cause far more serious health problems than enamel fluorosis, which tends to be mild if it happens at all. That's why approximately 72% of all public water systems, serving about 195 million people in the US, add fluoride to the level recommended to prevent tooth decay. This recommendation has recently been revised to 0.70 ppm (parts per million).

So how do you know if your baby is getting too much? You are right to zero in on drinking water, because that is the most likely source of fluoride in the case of a formula-fed infant (human breast milk has little fluoride). The formula powder itself probably does not contain very much. But it's important for you to find out exactly how much fluoride your drinking water contains.



The stark white areas of enamel represent a small area of enamel fluorosis, which develops if your child is getting too much fluoride.

A good place to start is your local water utility or health department. If your state participates in the federal Centers for Disease Control and Prevention (CDC) program known as "My Water's Fluoride," you may be able to look up your water's fluoride content online. Go to <http://apps.nccd.cdc.gov/MWF/Index.asp> to see if your community is listed. A local pediatric dentist or your child's pediatrician should also be able to help you with this issue.

Fluoride use is mainly a concern up until the age of about 9, when the enamel of the permanent teeth has developed.

In areas where fluorosis has been identified as a risk, experts recommend the following:

1. Breast-feeding
2. Using ready-to-feed formula, which contains lower levels of fluoride
3. Mixing powdered formula with bottled water specifically labeled as "de-ionized," "purified," "demineralized," or "distilled."

I realize none of these choices offers the ease and/or economy of powdered formula, which is why you should seek the help of local health and dental professionals to come up with a plan that's best for you and your child.

Sincerely,
Jessica Y. Lee DDS, MPH, PhD

ABOUT THE AUTHOR

Jessica Y. Lee DDS, MPH, PhD

Dr. Jessica Y. Lee received her DDS from Columbia University School of Dental and Oral Surgery in 1997, her MPH, and subsequently a PhD in health policy and management from the University of North Carolina in 2002. She is a board-certified pediatric dentist and associate professor in the Department of Pediatric Dentistry at the University of North Carolina.

The editorial content in this magazine is a forum for you and your family's dental concerns and is not influenced by commercial interests. No action should be taken based upon the contents of this magazine. Instead please consult with your dental professional.

Teething Troubles

How to Help Keep Your Baby Comfortable

A Consultation with Dr. Aparna Aghi

✉ Teething Troubles?

From: Carla (North Carolina)

To: Consultations@deardocor.com

Subject: Teething Troubles?

Dear Doctor,

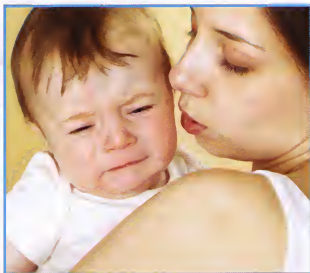
My baby is six months old and she seems to be teething. What can we expect and how can I keep her comfortable?

Dear Carla,

Teething is definitely a notable milestone in an infant's life — and your baby will quite frequently let you know it. A hot topic among many new parents, teething is the process by which an infant's teeth sequentially appear in the mouth. More specifically, it describes the tooth eruption process through which primary (baby) teeth emerge through the gums and into the mouth. The typical time frame for teething to begin is usually between six and nine months although it may start as early as three months or as late as twelve months in some cases.

Most children have all 20 of their primary teeth by the age of three. Typically, although not invariably, the two lower front teeth tend to erupt first, followed by the two upper front teeth. The first molars come in next, followed by the canines (eyeteeth).

Teething is different for each baby, and both symptoms and length of time it takes for a tooth to make its appearance vary.



What You Can Expect

Although teething is different for each baby, and both symptoms and length of time it takes for a tooth to make its appearance vary, many parents recognize the following signs:

- Irritability
- Biting and gnawing
- Gum swelling
- Chin (facial) rash
- Disrupted sleeping patterns
- Ear rubbing
- Drooling
- Decreased appetite

Although most infants make it through the teething process without much discomfort, occasionally it can be considerable. Even if there is no discomfort you can expect a child to exhibit some of the classic signs and symptoms associated with teething. For example, don't be surprised if your baby's gums become swollen or if she begins to drool more than usual as tooth eruption triggers excess saliva production. Biting or chewing on anything she can get her hands on to alleviate or stimulate the process is quite common. Excessive salivation can lead to

chin reddening and chafing. She may also start to wake up frequently during the night.

These symptoms are usually most prevalent during the week that the tooth or teeth actually begin to break through the gums, starting about four days before the event and lasting about three days after a tooth finally appears.

Gum swelling may occasionally be associated with eruption cysts (fluid-filled sacs), which appear as small, bluish, almost see-through, bubble-shaped swellings overlying an erupting tooth. Occasionally blood mixes with the fluid, when they are referred to as eruption hematomas ("hemat" – blood; "oma" – swelling or tumor). Generally, no treatment is needed because the tooth erupts through the cyst, popping it, which causes it to disappear spontaneously.

While there is some controversy, most sources agree that diarrhea, rashes and fever are not normal for a teething baby. If your infant has a fever or diarrhea while teething or continues to be cranky and uncomfortable, call your pediatric dentist or pediatrician. Evaluation is necessary to rule out a systemic (general body) cause for the illness.

How You Can Help Keep Her Comfortable

Here are some other remedies that may help reduce the irritation your baby is experiencing in her mouth:

- **Teething rings** – The American Academy of Pediatric Dentistry (AAPD) recommends parents use a clean, chilled, rubber teething ring, or cold wet washcloth for teething babies.
- **Chilled pacifiers** – These are also helpful. Be careful not to freeze teething rings or pacifiers, as ice can burn if left in place too long.

- **Gum massage** – Massaging inflamed gums with your clean finger may be helpful to counteract the pressure from an erupting tooth.
- **Cold foods** – When your youngster is old enough, cold foods like popsicles may soothe sore gums, but confine them to mealtimes because sugars can cause decay.
- **Over-the-counter medicine** – If teething pain persists, you can give your baby acetaminophen or ibuprofen, but check with a pharmacist for the correct dosage. The medicine should be swallowed and not massaged into the sore areas, as this, too, can burn. Despite the old practice of rubbing alcohol on the gums of a teething baby, no amount of alcohol should be used or given. Products containing Benzocaine*, a numbing agent should not be used for children less than two years of age, except under the advice and supervision of a healthcare professional.

See Your Dentist Or Pediatric Dentist

Lastly, and most importantly, if you are not sure what to look for, or are concerned about your baby's continuing discomfort, see your dentist or pediatric dentist — a specialist in the growth and development of children's teeth and jaws. Pediatric dentistry includes the management, treatment and prevention of dental problems such as teething. It's also important to make sure your child is just teething and that nothing serious is causing her symptoms. Remember, the right time to see and establish a relationship with a dentist or pediatric dentist is in the first year of your child's life.

Sincerely,
Aparna Aghi, DMD

*Please note that the FDA recently issued a warning to the public that benzocaine, the main ingredient in over-the-counter (OTC) gels and liquids applied to the gums or mouth to reduce pain in such conditions as teething, is associated with a rare, but serious condition, in which the ability of the blood to carry oxygen is reduced. In severe cases, it can result in death.

ABOUT THE AUTHOR

Aparna Aghi, DMD

Dr. Aparna Aghi received her DMD from Harvard School of Dental Medicine in 2000 and completed a general practice residency in Manchester, New Hampshire in 2001. Dr. Aghi practiced dentistry in Exeter, New Hampshire from 2001-2005. She completed a residency in pediatric dentistry and an MS in Craniofacial Sciences at the University of California, San Francisco, where she is now an assistant professor. Her interests include improving children's access to dental care and public policy affecting oral health. She is in private practice specializing in pediatric dentistry.

PROBLEMS TO WATCH FOR

If you notice one of the problems below, visit your pediatric



Normal appearance of a 6 to 8 year old's teeth

Note how the four upper and lower anterior (front) teeth have erupted into place without crowding.



1.

Excessive Spacing

If the deciduous (baby) front teeth have excessive space present it could be an indication of a discrepancy between the sizes of the teeth and jaws.



2.

Underbite

All of the lower teeth are in front of the upper teeth.



3.

Open Bite

There is a space or opening between the upper and lower front teeth instead of a normal overlap.

Did you know that prolonged thumb sucking (beyond the age of 4) can result in malpositioned teeth and an open bite?

IN CHILDREN AGES 6 TO 8

dentist, general dentist or orthodontist for an evaluation.



Crowding

Occurs when there is insufficient space for the primary or permanent teeth to erupt into proper position.



Deep Bite

The upper front teeth cover too much of the lower teeth. In severe cases the lower front teeth may bite into the palate.



Crossbite (Front Teeth)

Some of the lower front teeth are in front of the upper teeth.



Crossbite (Back Teeth)

Some of the lower back teeth bite outside of the upper back teeth instead of inside.



Protrusion/Retrusion

Can occur by the upper teeth or jaw being too far forward (protrusion) or lower teeth or jaw being too far back (retrusion).



Abnormal Eruption

Permanent teeth erupt out of normal position if the baby teeth are out of position and not lost in the normal sequence.



When Children Grind Their Teeth

Is The Habit Of 'Bruxism' Harmful?

by Rochelle G. Lindemeyer, DMD

It's a screeching, gritting sound as unnerving as scraping fingernails across a blackboard. The first time you hear it in your sleeping child's bedroom you may wonder: What could possibly be going on in there? What a surprise to find that such a small person can make such a loud noise — and not even wake up!

Teeth grinding, or "bruxism," is actually a very common habit among children, particularly those under age 11. It's so common, in fact, that it is often considered normal behavior. It is only when it causes severe tooth wear, pain, or trouble sleeping that it may rise to the level of a significant problem. Yet healthcare professionals do not always agree on how or when to treat bruxism — if at all. And the causes are not completely understood, though psychological stress appears to play an important role.

THE DAILY (OR NIGHTLY) GRIND

The term bruxism comes from the Greek "brychein" from which is derived "ebryxa," to gnash the teeth. It was first used in 1931 to describe involuntary, excessive grinding, clenching, or rubbing of the teeth together. More recently, it has been further defined as a diurnal (during the day) or nocturnal (at night) parafunctional activity ("para" - outside, "function" - normal). It refers to movements of the teeth and jaws that are not necessary for functional activity — chewing, speaking or swallowing, for example. Repetitive parafunctional forces can damage the teeth when they occur through these quite unconscious habits.



Children are susceptible to various habits conducted without consciousness, such as nail and cheek biting and non-nutritive sucking. Parafunction when awake, which manifests as clenching and/or grinding of the teeth, often occurs without awareness, especially during stressful situations or intense concentration. When a child is made aware of it, the bruxism can be stopped or modified. On the other hand, a child cannot consciously stop bruxing while asleep.



SOME THEORIES TO CHEW ON

In healthy infants, sleep bruxism typically starts at about 1 year of age, soon after the front teeth come into the mouth. In young children, teeth grinding may be due to the immaturity of the neuromuscular system (“neuro” – nerves; “muscular” – muscles) that controls chewing.

Current thinking is that bruxism is part of an arousal response, defined as a sudden change from deeper to lighter sleep or awakening. In young adults, more than 80% of sleep bruxism episodes occur during periods of sleep known as stages 1 and 2 non-Rapid-Eye-Movement (REM) sleep, and only 5% to 10% in REM (deep) stages. Many of these episodes lead to a shift in sleep stage, usually toward awakening or lighter sleep.

Some medications, such as the most commonly prescribed antidepressants, may contribute to grinding habits.

Bruxism is prevalent in children who snore and/or breathe through their mouths. One theory suggests there is a correlation between sleep bruxism and upper airway obstruction, causing obstructive sleep apnea (“a” – without, “pnea” – breath), in which the tongue and tissues at the back of the mouth fall backwards and block the airway. Sleep apnea can be dangerous. It can lead to episodes of awakening throughout the night to gasp for air, interrupting restful sleep and growth, and depriving the brain of adequate oxygen. It appears to happen more often in children who sleep on their backs. A link has also been made between teeth grinding and enlarged tonsils, which in turn is strongly correlated to upper airway obstruction. Removing the tonsils and adenoids has been shown to lessen teeth grinding in some children. Asthma and respiratory airway infections may also be factors in bruxism.

Some medications, such as the most commonly prescribed antidepressants, may contribute to grinding habits. The number of children taking this type of drug is growing, so this is an important factor to consider when treating children with bruxism. Hyperactivity is also associated with bruxism as are the amphetamines used for managing attention deficit hyperactivity disorder (ADHD).

In older teens, factors implicated in teeth grinding include smoking, alcohol, illicit drug use, as well as other medications, trauma and disease. In addition, a host of diseases among children have been linked to bruxism, such as cerebral palsy, Down syndrome, and epilepsy.



What Is "Normal" Tooth Wear?

Wear of the teeth is most apparent on the occlusal, or biting surfaces of teeth. It can occur when the upper and lower teeth grind together. Wear results in the removal of enamel from the tooth surfaces and when severe, progresses into the softer dentin, which makes up the body of the tooth. Other structures, such as the jaw joints and muscles, can suffer from excessive grinding forces.

There are no clear guidelines for what constitutes "normal" wear, but we do know it should be commensurate with aging. It is natural to expect some wear of the primary (baby) teeth.

Normal forces are applied to the teeth during both biting and non-biting contact. Biting and chewing normally generate forces of between 13 – 23 pounds. During non-biting contact the teeth come together fleetingly hundreds if not thousands of times a day at a force of 0.75 – 7.5 pounds. These brief contacts provide the stimulation necessary to maintain normal, healthy bone and its attachment to the teeth.

Parafunctional forces or pararnormal forces by definition are outside the normal range. The average person (adult) can generate a parafunctional biting force of anywhere between 23 – 230 pounds. Parafunctional forces are generated most often through clenching and/or grinding habits. They can stress the muscles, the jaw joints, the periodontal ligaments or the teeth themselves, causing excessive wear or even fractures, and loosening of the teeth. However excessive force may also not cause any symptoms at all.

Parafunctional forces can impact the teeth through habits other than clenching and grinding, also known as "tooth-to-tooth" habits. Tooth-to-foreign-body habits involve a broad range of objects that individuals habitually hold between their teeth, such as toys, nails, pencils and bobby pins. These objects can cause abnormal wear patterns and also move teeth. Tooth-to-soft-tissue habits, such as thumb or finger sucking, are unlikely to cause wear; however, they can cause irregularities in bite and swallowing patterns.

Factors other than clenching and grinding can increase wear. Decay compromises the structure of teeth. Various restorative (filling) materials can also affect the rate of wear of the tooth surfaces.

Tooth-to-foreign-body habits involve a broad range of objects that individuals habitually hold between their teeth, such as toys, nails, pencils and bobby pins.





The rise of soft drink consumption in children has also contributed to the development of tooth wear by enamel erosion.

BRUXISM, STRESS AND HEREDITY

Bruxism, either clenching while awake or grinding during sleep, is associated with stress and anxiety. The exact mechanism by which these and other psychological factors contribute is still unknown. Emotionally stressful states are often manifested physically by an increase in the release of adrenaline-like hormones, which initiate the "fight or flight" response. One study showed that people with bruxism have elevated levels of these hormones in their urine compared to those who don't grind their teeth. Interestingly parafunctional habits seem to run in families, so this activity may be genetic.

Another study looked at teeth grinding as it relates to aggression and somatization, the process by which psychological distress is expressed as physical symptoms. The report indicated that an increased amount of aggression manifests physically as bruxing in children as young as 5 and 6.

Bruxism is found in those who suffer from post-traumatic stress disorder, further suggesting that psychological factors may be involved. Counseling and other forms of relieving psychological stress, such as muscle relaxation, have been shown to reduce teeth grinding in children.

TREATMENT AND PREVENTION — OR NOT

Because children generally outgrow the condition, treatment is not usually recommended — unless the habit is causing troubling signs and/or symptoms, as well as excessive tooth wear. But it can be difficult to determine if dental wear indicates a current tooth-grinding habit, as bruxism varies over time. Other symptoms associated with bruxism, such as headache, jaw pain or ear pain, can also be caused by things unrelated to teeth grinding. Another important consideration is whether the child's diet is a factor. The rise of soft drink consumption in children has also contributed to the development of tooth wear by enamel erosion. Sodas (either with high sugar content or the diet variety), sports drinks, and fruit juices are very acidic and bathe the teeth in tooth-eroding acid, especially if consumed throughout the day. Saliva, nature's way of neutralizing acids, needs at least 30 minutes to stop this process.

Saliva, nature's way of neutralizing acids, needs at least 30 minutes to stop the erosion process.

If a pediatric dentist or general dentist traces your child's dental problems to teeth grinding, he or she may recommend a thin, plastic nightguard to prevent parafunctional activity during sleep, though this remedy has not proven effective for baby teeth. Your pediatric or general dentist may also recommend that parents enlist the help of a specialist. Children with upper airway obstruction should be referred to a doctor known as an Ear, Nose And Throat (ENT) specialist. Kids with severe psychological problems should be referred for therapy. Parents of children or adolescents who are taking medications that may cause bruxism can discuss the condition with the child's primary care provider including whether it's possible to switch medications.

Until the origins of teeth grinding in children are more fully understood, treatment will continue to be based on anecdotal evidence. The important thing to remember is that the habit of teeth grinding is usually harmless, despite the unsettling sounds. Luckily, new teeth will be on the way.

ABOUT THE AUTHOR

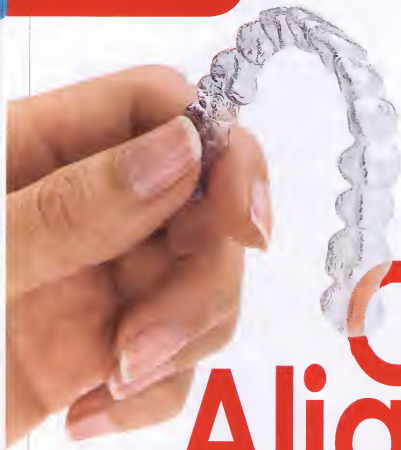


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Clear Aligners FOR TEENS

User-Friendly Orthodontics

by Gary P. Bringham, DDS, MSD

The 21st century has embraced technology like no other, and nowhere is it more evident than in the daily lives of our teens. In fact, technology has changed nearly every aspect of their lives.

Technology is even impacting orthodontics ("ortho" – straight; "dont" – teeth), which facilitates the change from "ugly ducklings" into maturing individuals with straight teeth and beautiful smiles. Traditionally, metal braces have been considered a necessary rite of passage, but the only choices adolescents had to express their individuality during orthodontic treatment were the selection of colored rubber bands and retainers. Today's teens often regard braces as restrictive, confining, and obstructive to their lifestyles. Diet modification, cosmetic detracting, mechanical irritation from the braces and wires themselves, and discomfort following adjustments that can last for days — all negatively impact a teen's capacity to function normally during an already difficult phase of life.

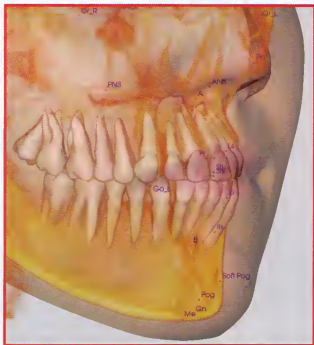
Invisalign® aligner, photos courtesy of Align Technology, Inc.



CLEAR ALIGNERS — MADE CLEAR

Clear aligners, introduced in the late nineties as an alternative to traditional braces, use a system of individual clear, removable “trays” to gradually straighten teeth. Aligning the teeth is accomplished with a series of these trays, referred to as aligners, each made of almost invisible polyurethane plastic that completely covers the teeth. Each aligner is slightly different than the previous one, and when worn for 20 to 22 hours per day for a two-week period before moving on to the next set in the series, will move the teeth into an improved, predetermined position.

The aligners are computer-generated based on photographs, models of your teen's teeth and bite, and radiographs (x-ray films) taken by an orthodontist, a dentist who has undergone specialized training in the study of growth and development of the teeth and jaws, and the treatment of malocclusion (“mal” – bad; “occlusion” – bite). Some general dentists who have undertaken some additional study may also perform limited orthodontic treatment.



CAT scan imaging allows for planning of orthodontic movement in three dimensions and creation of the clear aligners. Photo provided by Anatomy, Inc.

The models are sent to a specialized laboratory for scanning from which a computer creates a 3D (three dimensional) image. The position of each tooth is manipulated individually on the computer screen into a new improved position as prescribed by the orthodontist until they are all in proper alignment. The customized software then simulates the movement of the teeth, in stages. The orthodontist reviews the simulation online and approves or modifies the treatment. Once approved, a plastic aligner is manufactured for each step of the movement, and the complete tray system is then sent to the orthodontist.



The most significant advantage is that the aligners can be taken out for eating and on a very limited basis for important social occasions. They can also be easily and thoroughly cleaned before and after use. They allow for ease of brushing and flossing to maintain excellent dental health, which is especially important during orthodontic tooth movement.

Attachments called buttons, made of a tooth-colored glass-like composite material that blend with the teeth, are sometimes temporarily bonded on to the teeth to provide additional leverage. They are necessary for moving severely rotated teeth in more complicated directions to align them. More traditionally, elastics (rubber bands) are also used to move the teeth forward or backwards

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within the jaws. Where crowding of teeth is mild, minor reshaping (by filing) to reduce the width of the teeth, a process also known as Interproximal Reduction (IPR) ("inter" – between; "proximal" – adjacent surfaces), can create enough space to straighten them with aligners. Aligners can also be used to close spaces between teeth or "re-approximate" them.



Clear aligners fit over the teeth precisely, exerting pressure that causes the teeth to move into a better position.

The last aligner in the sequence does not necessarily determine the final position of the teeth. If further refinement is necessary, more aligners can be ordered until the final result is satisfactory to both teen and doctor. The time necessary for clear aligner treatment will vary from 6 to 24 months, and will depend upon the amount of movement necessary, which in turn depends upon the degree of complexity of the malocclusion. After the regular aligner treatment is completed, retainers, either fixed to the teeth using small wires behind them, or removable retainers, composed of a similar plastic material, are usually required to be worn for a period of months or longer — the same as following traditional braces.



After orthodontic treatment is completed, a wire is bonded into place to prevent teeth from shifting position.

NEW AND IMPROVED ALIGNERS — CUSTOMIZED FOR TEENS

Imagine, if you will, a stick poking up from a small hill of sand; let's say that stick represents a tooth. To move the stick, you could "tip" it in one direction, backwards, forwards or sideways, without changing the position of the bottom of the stick, in other words moving the stick in one plane only (2D – two dimensions of space). That's what clear aligners were initially designed to do. Now, with the addition of tiny "power ridges" and other barely visible specialized features that apply more controlled and efficient force, they can move teeth in 3D (three dimensions), i.e. not only tipping the stick backward, forward or sideways, but also dragging the stick bodily through the sand. In the real life situation this equates to moving a tooth root bodily through bone to line it up.

Today, the enhanced system features aligners made from a thinner more comfortable material.

In the beginning, clear aligner appliances were successful in limited 2D movements of the teeth in one plane, realigning or straightening them, closing mild spaces, treating elongated and tipped teeth into better position. The system was recommended if the bite was "normal" — meaning the back teeth already fit together properly. With a normal bite, biting forces distribute evenly on all of the teeth, which also protects the health of the supporting periodontal structures ("peri" – around; "odont" – tooth), the gums and bone. With an abnormal or bad bite, forces are uneven, creating uneven wear and instability of the position of the teeth.

Today, the enhanced system features aligners made from a thinner more comfortable material, and the interval for changing each set of aligners can be modified to be every 7 or 10 days, or the customary 2 weeks. Along with these changes has come the product's ability to achieve more predictable tooth movement, which helps when treating even teenagers with malocclusions where the only prior choice may have been traditional braces.

Why Can Teeth Be Moved At All?

The periodontal ligament ("peri" – around, "odont" – tooth) is a unique connection between teeth and their surrounding bone that is key to what allows them to move and be moved. It is comprised of a group of fibers made of a protein called collagen, which suspend the teeth in the bone. The fibers join to the tooth-root surfaces by inserting into "cementum" that is deposited by living cells. On the other side of the ligament, the fibers insert into bone that is very much alive. The total ligament is like a hammock, allowing teeth some movement in their sockets, through which they are able to respond to the stresses of biting (force).



The periodontal ligament helps teeth move through bone when orthodontic forces are applied to the teeth.

Modeling and Remodeling

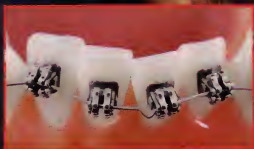
The periodontal ligament is constantly changing, a process that is mediated through the cells of the ligament, cementum and bone. Together, they continually form and reform in response to the normal forces of the bite. Biting produces tension and compression transmitted through the fibers of the ligament. Tension causes the cells to respond by depositing new bone and cementum, while compression causes resorption or melting away/dissolving of existing bone and cementum.

Moving Teeth With Orthodontics

What allows orthodontics ("ortho" – to straighten; "dont" – teeth) to move teeth is the careful application of force, which can be used to guide the teeth into new improved positions and equilibrium. Light constant forces applied to the teeth allow them to move in a predictable manner and direction, harnessing the normal modeling and remodeling process of bone.

Traditional Orthodontics – Braces

Orthodontic forces have been traditionally applied to the teeth via small brackets that look like mini train tracks, which are rigidly attached to the crowns of the teeth and to which "arch" wires (so-called for their shape) are secured. The arch wires apply controlled light forces, which cause the teeth to move in a predictable manner and direction through the bone that supports the teeth. The wires carefully modulate the forces transmitted to the bone to control the rate of resorption and deposition of bone to stabilize the teeth in their new position.



In fact, the treatment of teens with the clear aligner system has changed considerably in the past several years. For example, teens were normally not considered good candidates for this system because their second molars (the last to come in, except for the wisdom teeth) had not fully grown into position. Clear aligners now have "eruption tabs" that serve as space-holders for teeth that have not yet fully erupted.



Colored compliance indicators motivate teenagers to be more responsible for wearing their aligners.

Teens also were generally not considered good candidates for this system because it was assumed they would not be as conscientious as adults about wearing the aligners. Clear aligners for teens now have colored compliance indicators built into the aligner material that fade with time as each aligner is worn. These indicators allow dentists, parents, and teens alike to monitor both compliance with a teen's planned treatment program and progress, and to modify treatment accordingly.



BETTER THAN BRACES — IN THE RIGHT CASES

Being able to examine the specific movement patterns for all teeth in detail on the computer is a tremendous advantage. Your teen's orthodontist or dentist can simulate different treatment scenarios and determine which is best. The teen can then see the progressive outcomes of his or her customized treatment plan on the computer screen before making any final decisions on whether or not to proceed.

In mild anterior open-bite situations — where the front upper and lower teeth do not meet or contact each other (from eyetooth to eyetooth in both upper and lower jaw) — clear aligner treatment is especially advantageous. The material covering the posterior (back) teeth exerts pressure in conjunction with the individual's natural biting force, while the attachments to the anterior (front) teeth are effective in closing the open bite. This situation is more difficult to treat with traditional braces.



A photograph before treatment showing a bite that is not ideal.



A photograph after treatment with clear aligners, showing a more ideal bite.

In addition, teens who have clenching or grinding habits, which can lead to excessive wear and tear on their teeth, can benefit from using clear aligners while they sleep. In these cases, the aligners also serve as thin nightguards. This can reduce the discomfort (to facial muscles and surrounding tissues) caused by these unconscious habits.

YOUR DOCTOR IS YOUR BEST GUIDE

Orthodontics using clear aligners is not for every teen, and its application will depend on each individual's situation. An orthodontist is in the best position to analyze difficult malocclusions to determine a teen's candidacy, and to take into account how predicted jaw growth and development will impact treatment.

Malocclusions can be caused by discrepancies not only in tooth position, but also in jaw alignment. In some of these cases, auxiliary treatment incorporating elastics (**rubber bands**) and/or expansion appliances may be used in conjunction with aligners, just as in traditional orthodontic treatment. In more severe cases, traditional orthodontic braces may offer more control of tooth movement, and in addition jaw surgery may be needed to improve tooth alignment, function and facial aesthetics.

In addition to a teenager's compliance with the treatment program, the orthodontist's (or dentist's) expertise with clear aligners can significantly impact the outcome. Clear aligner treatment has only recently been taught in selected dental schools, and is still considered a relatively new treatment system. Therefore, orthodontists who have the most success using clear aligners are usually the ones who have gained extensive clinical experience treating mild malocclusions before tackling more complex cases with these appliances. It would be prudent to find out how many cases a dentist or orthodontist you are considering has treated with this system.

CLEAR ALIGNERS AS THE 21ST CENTURY SOLUTION

Clear aligners represent a whole new spin on high-tech orthodontic treatment for the 21st century teen. Orthodontists who have embraced this technology, which has evolved to better suit the needs of contemporary teens, are using it to more fully engage young people in their own treatment by involving them in the monitoring of their progress. Because the pressure applied to the teeth with these custom aligners can be modified, teens can actually control the pace and comfort level of their treatment according to their individual sensitivity and activity. More importantly, they are given an opportunity to make their own choices on their own schedules.

Clear aligners can positively impact a teen's capacity to function normally and in a socially acceptable way during a difficult and transitional phase of life.

Orthodontics using clear aligners is not for every teen, and its application will depend on each individual's situation.

ABOUT THE AUTHOR



Gary P. Brigham, DDS, MSD

Dr. Gary Brigham graduated from Case Western Reserve University School of Dentistry in 1974 and gained his MSD in orthodontics, graduating first in his class in 1976. He received the Harry Sicher Award from the American Association of Orthodontists for best graduate research in the U.S. Dr. Brigham has served as an Assistant Professor of Pediatric Medicine and post-doctoral fellow at the Center for Craniofacial Anomalies at the University of Illinois Medical Center. He is a nationally recognized authority and lecturer on clear aligners, with over 1,000 patients treated. In 2008, he delivered the keynote address on Invisalign Teen at Align Technology's Invisalign Summit in Las Vegas. He has been in private practice specializing in orthodontics since 1987.

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Creating In-Office Dental Restorations With Computers

Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) Makes The Virtual Real In Dentistry

by Daniel J. Poticny, DDS, FACDNA

As we journey into the 21st century, technology is touching our lives in ways we could hardly have envisioned a couple of decades ago. Computers can make our travel arrangements, take us to a virtual college classroom — even reveal a 3D virtual world from a movie director's imagination. But today the virtual world is actually morphing into the real one, right in the dentist's office. Computers are being used to fabricate new crowns, veneers and fillings for teeth — before your very eyes. It's true, and actually has been for years.



Dental technology known as Computer-Aided Design/Computer-Aided Manufacturing, or CAD/CAM, recently turned 25. During its first quarter-century, innovations to the system have made CAD/CAM feasible for most dental practices. Dentists who choose to use this technology — and their ranks are growing — can now create laboratory-grade dental restorations in minutes. To understand how truly extraordinary this is, let us first look at the traditional way of designing and manufacturing a dental crown (cap).

ONCE UPON A TIME

In the traditional repair of a badly decayed tooth, a dentist removes the decay and prepares (drills) the tooth so that it can be restored to its original shape, function and looks, the first step in a process commonly known as crowning or capping. The next step is to take an impression of the prepared tooth (a very detailed and accurate physical replica of the prepared surfaces) together with the adjacent teeth by using a rather goopy, putty-like impression material. The material is left to set for five minutes, after which time it is removed. Liquid stone is then poured into the impression, which, once cured, provides an indelibly accurate model of the teeth and bite. A laboratory technician uses this model to make the crown, building up layers of dental porcelain (in powdered form) until the correct shape is achieved. The crown is then fired in an oven, turning powdered glass into porcelain, which is stained and/or glazed for a realistic finish. It's a labor-intensive process that requires a skilled, artistic eye and hand. Communication between dentist and technician is also crucial to make sure the result will fit, both physically and aesthetically, with the individual's existing natural teeth.

The process, which can take weeks, ends with the finished crown arriving at the dentist's office. The patient will have a second appointment during which the crown is either cemented or bonded to the tooth, and adjusted to fit exactly to the prepared tooth and with the existing bite. It's a tried and true method with both its advantages and disadvantages, but now — enter CAD/CAM.

FAIRY DUST AND MAGIC WANDS

The CAD/CAM process starts the same way, removing the decay from the tooth and preparing it to retain a crown. But instead of making a physical mold of your teeth, a virtual model is created on a computer. What goes in your mouth is not a mouthful of impression material, but rather a light dusting of reflective powder that allows the dentist to capture multiple images of your teeth with, believe it or not, a small scanning wand.

The latest digital cameras will record the images automatically, using light of blue wavelength, which gives enough depth to record all the hills and valleys of the prepared tooth surfaces. It's as if you were scanning the surface of the moon and sending every detail back to earth.



A dentist holds a scanning wand (connected to a digital camera), which uses blue wavelength light to record images of the teeth to make a 3D computer model.



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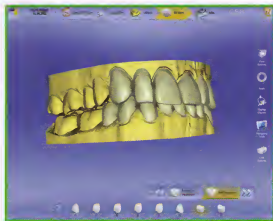
This is an actual patient of an AACD member dentist and laboratory technician ©2011

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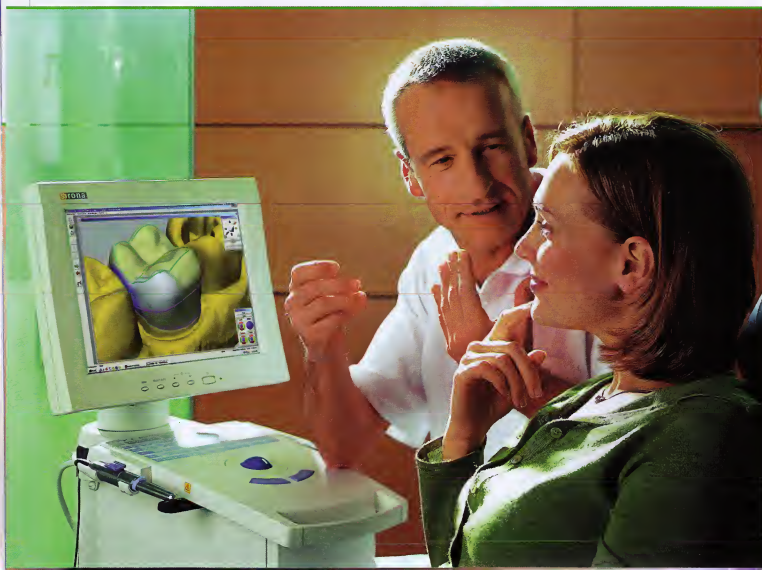


In seconds, the dentist will have a highly accurate 3D digital model of your teeth that is used first to assess whether your tooth has been adequately prepared for restoration. If needed the dentist can make corrections to the tooth, and then easily take another series of images.

Once the images of the prepared tooth are satisfactory, the light coating of reflective dust is easily rinsed from your mouth. The dentist will then design a crown, or veneer or filling, with the help of design software that contains a database of thousands upon thousands of tooth forms from which to draw and match your natural teeth. It's like trying on a million coats or dresses, until the perfect fit, style, and shape are found. The software has some other amazing features too, including a replication function that can create a mirror-image twin of the same tooth on the other side of your mouth. For example, if your dentist is capping your right front tooth, he or she can use the scanned information from the left front tooth to create crown contours that provide a mirror image.



A 3D model created by the scanning wand is displayed on a computer screen.



The next step is for the dentist to choose a small block of matching dental ceramic material from which to mill the crown. CAD/CAM materials have been improved over the years, offering greater strength and a more lifelike appearance. Crowns made from these new materials often don't need additional coats of stain or glazing to create a good match. Once your dentist chooses the material, you are now only minutes, not weeks, away from a fully restored tooth.



Blocks of dental ceramic material that will be used to create dental restorations.

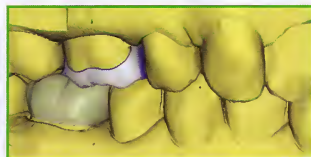


A milling machine located inside the dental office carves a restoration from a block of ceramic material.

The computer's digital design is transmitted to a milling machine that can carve the crown from the block of ceramic in about five minutes. After the milling is completed, the dentist will take the crown from the milling unit and check the fit and make any necessary adjustments right then and there. The dentist can refine the milled ceramic surface in several ways, such as using various finishing tools to create a "wet-look" surface gloss. Stains and glazes can be applied and fired in 12 minutes or less. Once finishing is complete, the crown is physically bonded to the tooth preparation, restoring it to normal shape, function and aesthetics, and even strengthening it in the process.



Upper and lower gold restorations that need to be replaced.



A computer model showing how the final restorations will look is sent to the milling machine for fabrication.



The final restorations, placed the same day.



CAD/CAM Materials

Any resemblance to Star Trek is purely coincidental — but CAD/CAM has taken dentistry to warp speed!

Dental ceramics are a group of materials that can be milled in the dental office and laboratory via CAD/CAM to create crowns and veneers. In 1987, the original CAD/CAM porcelain material was made of a fine particle ceramic called feldspar ("feld" – field; "spar" – ore), a crystalline substance mined from the ground for its toughness and optical glass-like properties. Feldspar can be compressed into blocks for machining and being the original material for the system has performed very well. These porcelains were modified in 1997 by adding leucite ("leuc" – white; "ite" – rock or stone), a finer-grained material that has a high glass content. Leucite is a mineral containing potassium and aluminum silicate, which lends a white appearance and imparts hardness. This material, called leucite-reinforced ceramic, is somewhat stronger than feldspathic porcelain and was found to be well suited to CAD/CAM protocols.

In 1997 another composite material was also introduced, a highly filled 85-90% ultrafine ceramic particle that was embedded into a plastic resin matrix and was developed as an alternative to porcelain. It has the advantages of a composite as it is part glass, part plastic resin, but is not as brittle as porcelain and therefore more resistant to fracture.

In 2007 a lithium disilicate ceramic was introduced that was considerably stronger than both feldspathic and leucite-reinforced ceramics and has equivalent aesthetic properties. The higher strength of this material allows opportunities for streamlined cementation and increases the indications for CAD/CAM utilization in the dental office.

Today, dentists are typically using leucite-reinforced and lithium disilicate ceramics to create high strength and yet aesthetically appealing CAD/CAM restorations in their offices.

The fit and finish of restorations created with CAD/CAM are as accurate as those produced in a dental laboratory with the same materials, but all of this has taken place within one office visit, without the involvement of a dental laboratory or the need for individuals to communicate effectively. The Tooth Fairy could hardly have done better!

This is not to say that machines can now do it all and individual expertise no longer matters. On the contrary, your dentist's training and artistic eye are more important than ever. And there is certainly a learning curve with every technology — you may remember your own efforts learning to use your first computer. In the right and experienced hands, however, CAD/CAM technology offers tremendous benefits to both patient and doctor.



An upper arch of old restorations that need replacement.



Restorations manufactured and placed the same day using CAD/CAM technology.

This is not to say that machines can now do it all and individual expertise no longer matters. On the contrary, your dentist's training and artistic eye are more important than ever.

HAPPILY EVER AFTER

Studies have shown that CAD/CAM restorations are demonstrating success rates similar to restorations fabricated using time-tested materials and techniques.

Continual evolution of the CAD/CAM system over the past 25 years has increased the speed and precision with which dentists can place high-quality, aesthetic restorations in many situations that in the past required traditional approaches. As a direct result of CAD/CAM technology, dental ceramics used today are higher in quality than those used in the past. And improvements to CAD/CAM hardware, software and materials continue to blur any remaining distinctions between the dental office and laboratory.

Since 1985, when the system first appeared in dental offices, more than 27,000 CAD/CAM units have been installed for in-office use in more than 50 countries. Dentists have placed more than 20 million restorations produced with these units and the technology is part of many dental schools' curricula. As present trends will in all likelihood continue, this extraordinary state-of-the-art technology may soon be coming to a dental office near you.



An amalgam restoration that is going to be replaced using CAD/CAM.



CAD/CAM technology creates an accurate, natural-looking restoration.

ABOUT THE AUTHOR



Daniel J. Poticny, DDS, FACDHA

Dr. Dan Poticny is an adjunct clinical associate professor at the University of Michigan School of Dentistry, Department of Cariology and Restorative Sciences and maintains a private practice. He is an educator, researcher and international presenter and is widely published on a variety of topics including materials, digital restorative dentistry, and clinical case reports. He is a co-founder of the Southwest Center for Advanced Clinical Studies and the Fully Integrated Practice dedicated to continuing education for dentists on digital restorative processes and their applications to modern dental care. He is a graduate of the Baylor College of Dentistry and a fellow of the Academy of Computerized Dentistry. He holds a teaching certificate from the International Society of Computerized Dentistry.

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Tooth Whitening Safety Tips

Are Bleaching Products Safe?

A Consultation with Dr. Yiming Li

✉ Tooth Whitening Safety Tips?

From: Melissa (Washington)

To: Consultations@deardoctor.com

Subject: Tooth Whitening Safety Tips?

Dear Doctor,
I'm 18 and my teeth are looking a bit yellow.
I want to whiten them, but I'm hesitant to
put bleaching gel on my teeth. How safe is it
and can anything bad happen?

Dear Melissa,

First of all, let me assure you that there have been no major health problems attributed to tooth whitening products when used as directed. Many studies have confirmed this, and I will share some of these findings with you momentarily. But first it's worth noting that a scientific understanding of safety is quite different from what consumers think about safety. For consumers, something is safe if it produces absolutely no harm. Scientists, however, recognize that there is nothing that fits this definition. As a Swiss physician and chemist once said, "All substances are poisons and there are none that are not poisons. The right dose differentiates a poison from a remedy."

I'm pointing this out because, while whitening products have a very good safety record, it is possible to injure your teeth if you overuse them or use one of poor quality. Take one reported case of a 13-year-old boy who purchased an over-the-counter whitening kit and used it excessively. He sought dental care when his teeth became so sensitive, he couldn't eat. An examination revealed



There have been no major health problems attributed to tooth whitening products when used as directed.

that the majority of the enamel on his front teeth was gone, exposing the sensitive dentin layer underneath. This case illustrates significant risks of abusing a whitening product, especially when it is of questionable quality.

Tooth whitening has become popular with teenagers, and so far the procedure appears to be safe when used appropriately. However, caution is advised especially for younger teens because they may still have some baby teeth that are being replaced and their yet-to-be-mature adult teeth are relatively vulnerable to the whitening processes.

Caution is advised for younger teens because they may still have some baby teeth that are being replaced and their yet-to-be-mature adult teeth are relatively vulnerable to the whitening processes.

To ensure the highest standards of safety, I recommend tooth whitening be done under a dentist's supervision — and after a thorough examination to determine the cause of the discoloration. You'll want to be sure you don't have an underlying dental problem that needs treatment. Then your dentist can help you choose a whitening treatment — for use at home or in the dental office — that's right for you.

Though whitening treatments are varied, the active ingredient is almost always hydrogen peroxide. The most commonly used form is carbamide peroxide, which splits into hydrogen peroxide and urea when activated. A gel of 10% carbamide peroxide equals around 3.5% hydrogen peroxide. Now we get to the heart of your question: Is hydrogen peroxide harmful either to systemic (whole-body) health or to the health of teeth in particular?

Many studies have been conducted on the toxicology ("toxic" – poison; "ology" – study) of carbamide peroxide and hydrogen peroxide during recent years, particularly of tooth whiteners. All of the credible scientific evidence available indicates that there is no association between tooth whitening and cancer. What's more, when tooth whitening treatments are performed correctly, the exposure to hydrogen peroxide is minimal.

It is generally accepted that tooth whitening is associated with some tooth sensitivity and gingival (gum) irritation. However, these side effects are usually mild to moderate and disappear when the individual completes or stops the whitening procedure. A vast amount of data is available to support the safety of whitening gels based on 10% carbamide peroxide. For those that contain

higher concentrations of whitening ingredients, research indicates a greater risk of tooth sensitivity and gum irritation. Although most formulations with greater than 10% carbamide peroxide appear safe (because so far there have been no reports suggesting significant adverse effects), the data on them are relatively limited compared to those of 10% carbamide peroxide.

To date, there are a number of studies regarding the safety of specific over-the-counter whitening products. Most of them appear safe, although some products have been shown to have a significant negative effect on tooth enamel, as mentioned above. Tooth whitening also can affect the strength, color and texture of other types of existing and planned dental work — another reason why it's so important to get professional input before you begin. Together, you and your dentist can brighten your smile in the safest way possible.

Sincerely,

Yiming Li, DDS, MSD, PhD

ABOUT THE AUTHOR

Yiming Li, DDS, MSD, PhD

Dr. Yiming Li received his dental education from Shanghai Second Medical University. He earned his masters and doctoral degrees from Indiana University in 1984 and 1987, respectively. He is Professor of Restorative Dentistry, Director of the Center for Dental Research, and Director of the Biocompatibility and Toxicology Research Laboratory at Loma Linda University School of Dentistry. He is also a professor of Microbiology and Molecular Genetics at Loma Linda University School of Medicine. Between 2006 and 2009, Dr. Li served on the U.S. Food and Drug Administration (FDA) Dental Products Panel; he is currently a consultant to the FDA and American Dental Association (ADA).

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Tooth Removal For Orthodontic Reasons

Bone Sets The Tone For Successful Treatment

A Consultation with Dr. Brandon R. Brown

✉ Tooth Removal For Orthodontic Reasons?

From: Mary (Texas)

To: Consultations@deardocor.com

Subject: Tooth Removal For Orthodontic Reasons?

Dear Doctor,

My teenage son recently saw an orthodontist who recommended that two teeth be removed prior to braces, plus a front tooth (damaged as a result of injury). How will this increase my son's chances of successful orthodontic treatment?

Dear Mary,

This is a complicated question with multiple elements, so let's try to break it down into understandable parts.

Which Teeth And Why

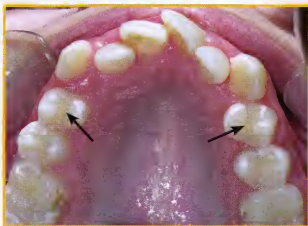
The first important phase of orthodontic treatment ("ortho" – to straighten, "dont" – tooth) is figuring out what needs to be done. Treatment often involves removing teeth to relieve crowding. Generally speaking, when there are too many teeth for the size of the dental arches (upper and/or lower jaws), there may not be enough space to align them. A common solution is to create the necessary space by removing teeth to allow the others to be aligned correctly. Conversely, where a front tooth has to be replaced and there is already adequate room for it, the space has to be maintained (to prevent other teeth from moving into it), until it can be replaced with a properly sized tooth.



The teeth most frequently removed for orthodontic reasons are the first bicuspid (premolar) teeth. These are the teeth right between the cuspid or eyeteeth (under the eyes) and the molar teeth (the biggest back teeth). In some cases premolar teeth can be removed without sacrificing future cosmetics or function.

A common solution is to create the necessary space by removing teeth to allow the others to be aligned correctly.

Photographs provided by Dr. Richard G. Rosenbloom



Due to significant crowding, extraction of the first premolars is necessary to properly align the remaining teeth.



Orthodontics completed with the second premolars moved into the first premolar spaces and the front teeth properly aligned.

Preserving Bone For Moving Teeth

Bone is a living tissue that continually reshapes itself in response to the stimulus of biting force or stress. Bone that normally supports the teeth slowly resorbs when the teeth are lost. Sometimes, if the bony housing surrounding a tooth is very thin, significant bone loss can occur after extraction. This process happens in just a matter of months, but can continue if steps are not taken to stop it. The surgeon removing a tooth may recommend a bone graft to preserve the socket bone if he is concerned that there will be too much bone loss. The reason for this consideration is that if there is insufficient bone through which to move the teeth, it can result in unsightly gum recession and root exposure following orthodontic treatment. Thus bone preservation following tooth extraction is critical to ensure that there is enough bone mass through which to move neighboring teeth for proper alignment.

(Continued on next page)

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Believe it or not, there is a real art and "feel" to tooth removal, and in experienced hands it can and should be done very carefully and atraumatically.

Removing Teeth While Preserving Bone

Believe it or not, there is a real art and "feel" to tooth removal, and in experienced hands it can and should be done very carefully and atraumatically ("a" – without; "trauma" – damage). If you think of a tooth socket like an empty ice-cream cone, it is quite easy to collapse, especially where the bony walls are thinnest. This is especially so on the facial surfaces (the surfaces facing the cheeks and lips), where gum recession is likely to show.

Fortunately, years of evidence-based research has led to modern surgical techniques that allow for maintenance of bone mass and volume in extraction sockets. This is most often accomplished as mentioned by atraumatic surgical techniques, and in some cases, bone grafting. In fact, placing a small amount of bone grafting material (most often processed bone safe for human use), just enough to fill the empty socket, acts as a scaffold upon which the body builds its own bone, eventually replacing the grafted material.

SOURCES OF GRAFT MATERIAL

Autograft: ("auto" – same person; "graft" – tissue transplant) Bone taken from the same person moved from one site to another.

Allograft: ("allo" – other, from another person – same species) Laboratory-processed human bone.

Xenograft: ("xeno" – different animal species) Laboratory-processed animal bone.

All allograft and xenograft materials are sterilized to ensure that they are neither rejected nor capable of transmitting infection or disease.

There's another important consideration to keep in mind in your son's case: Some of the bone supporting his front tooth may already have been lost or damaged as a result of his injury. Regeneration can be facilitated with bone grafting and specialized synthetic membranes. The membranes, supported by bone grafting material, can be used as scaffolds to rebuild the bone in a socket shape. And better yet, with today's biotechnology, both graft and membrane are replaced with healthy bone, and the self-dissolving membranes don't have to be removed.

More About Bone

— Planning For Future Tooth Replacement

Lastly, tooth extractions have implications for restorative dentistry (replacing lost or missing teeth) that involve tooth-supporting jawbone. In addition to maintaining the bone volume and density, it may be necessary to create or maintain space for a new tooth. This can be done with a dental implant, fixed (non-removable) bridgework, or (removable) partial denture. It is therefore important to plan for space, creating enough room and then maintaining it until the missing tooth is replaced. That way, whatever prosthesis (false tooth replacement) is chosen, it will look like it is natural and belongs there.

As they say in scuba diving — plan the dive, and then dive the plan. Your dental team needs to plan your son's case from beginning to end with the goals and sequence of tooth removal in mind. As I hope you can see, it really can be the bone that sets the tone for an aesthetic and functional final result.

Sincerely,

Brandon R. Brown, DDS

ABOUT THE AUTHOR

Brandon R. Brown, DDS

Dr. Brandon R. Brown, a practicing oral surgeon, earned his DDS at the University of Iowa College of Dentistry. He completed an externship in oral surgery at Louisiana State University and an oral and maxillofacial surgery residency at Loma Linda University Medical Center. He has collaborated on several publications in oral and maxillofacial surgery. Dr. Brown is board-certified by the American Board of Oral and Maxillofacial Surgery and is a fellow of the American Association of Oral and Maxillofacial Surgeons.

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Don't miss out on life because of a treatable condition. Talk to your dentist today.

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1. Radiographic Analysis of Crestal Bone Levels on Laser-Lok Collar Dental Implants. CA Shapoff, B Lahey, PA Wasserlauf, DM Kim, WPRD, Vol 30, No 2, 2010.

Monitoring Blood Pressure

What You Don't Know **Can** Hurt You

A Consultation with Dr. Wayne W. Herman

✉ Monitoring Blood Pressure?

From: Denise (New Hampshire)
To: Consultations@deardoctor.com
Subject: Monitoring Blood Pressure?

Dear Doctor,
I went to see a new dentist and was surprised that my blood pressure was taken. Is this normal practice?

Dear Denise,

I'm glad to hear that your blood pressure was taken at your dentist's office. Dental professionals can play an important role in screening for diseases that can affect not only your general health, but also your dental health — and treatment.

Here's why: Hypertension, the medical term for high blood pressure, is the most common primary diagnosis in the United States. It is a major cause of cardiovascular ("cardio" – heart; "vascular" – blood vessel) disease (CVD), an increasingly prevalent public health concern. A staggering 80 million people are recognized as having some type of CVD. Even more noteworthy, a significant proportion of people are unaware of their disease.

What's more, studies have confirmed that people don't always see their doctors as regularly as they see their dentists. And when they do go to the dentist, they usually believe they are medically healthy. One study published in the *Journal of the American Dental Association* looked at dental patients who had no reported cardiovascular risk factors and who had not seen a doctor in the previous 12



months. When their blood pressure was taken along with other screening tests while visiting a dental office, it turned out that 17% were at an increased risk of experiencing a cardiovascular event in the next 10 years and didn't know it.

Additionally the U.S. Preventive Services Task Force (USPSTF) has reaffirmed that asymptomatic adult patients with sustained high blood pressure, greater than 135/80 mm Hg (millimeters of mercury) should be tested for diabetes, even in the absence of symptoms. The recommendations emphasize the importance of early recognition of high blood pressure, which, like type II diabetes, is often referred to as the "silent killer" because it commonly occurs without symptoms and remains undiagnosed during its earliest stages.

Blood Pressure Screening - You And Your Dentist

Screening for diseases is meant to identify those who have an increased likelihood of developing a disease or experiencing an increase in disease severity, as a first step in disease prevention and control. That's where your dentist and other health professionals come in.

Blood pressure refers to the amount of force your circulating blood exerts on your blood vessels. Its measurement is expressed as "systolic" pressure over "diastolic" pressure in millimeters of mercury (mmHg). Systolic pressure is the peak pressure in the arteries when the heart is contracting. Diastolic pressure is the lowest pressure when the heart muscle is at rest between beats. Optimal blood pressure is less than 120/80 mmHg. It takes just a few minutes to measure and record this potentially life-saving information.

Your blood pressure measurement provides important information to your dentist, your physician and you. In addition, any situation that causes stress can increase blood pressure — even undergoing dental work. If your blood pressure is already high, it could result in a dangerous situation, and in a worst-case scenario, prompt a heart attack or stroke. Even if you are taking medication for hypertension, your blood pressure should be monitored. If your blood pressure reading is higher than normal, your dentist will likely refer you to a physician for further testing. A diabetes screening may also be recommended if your blood pressure is high.

The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure presented the following recommendations for the prevention and management of high blood pressure:

- Cardiovascular disease risks begin at 115/75 mm Hg, and doubles for each incremental increase of 20/10 mm Hg.
- For adults over 50 years of age, systolic pressure above 140 mm Hg is a more important risk factor for cardiovascular disease than diastolic pressure.
- Pre-hypertensive individuals, with systolic pressure of 120 to 139 mm Hg (or diastolic pressure of 80-89 mm Hg), should make health-promoting lifestyle modifications. These include weight control, smoking cessation, dietary sodium reduction, appropriate physical activity, moderation in consumption of alcohol, and a healthy diet rich in fruits, vegetables and low-fat dairy products. Without these measures, blood pressure may not be controlled adequately despite the use of antihypertensive drugs.

Managing Hypertension: Critical for Oral And General Health

If you are diagnosed with hypertension, your dentist should measure your blood pressure and review all of the medications you are taking at each visit. A significant number of anti-hypertensive (**blood pressure**) medications have undesired oral side effects (notably dry mouth, which can lead to severe tooth decay) that can require intervention by your dentist. Also, be aware that epinephrine — adrenalin, the naturally produced hormone that makes your heart rate and blood pressure go up in the fight-or-flight response — is a vasoconstrictor ("**vaso**" — **blood vessel**; "**constrictor**" — **to tighten**) commonly used in local anesthetics to prolong the numbing effect. However, it is widely recommended that vasoconstrictor usage be limited in people with cardiovascular disease. Dentists' experience in dealing with countless patients over many years supports this practice.

All In The Service Of Your Health

In summary, dentists can provide a valuable public health service by regularly checking their patients' blood pressure and informing them when measurements are suggestive of hypertension. As healthcare providers, dentists should be active in monitoring hypertension, assessing patients' cardiovascular status and their ability to withstand potentially stressful procedures, and should promote changes in their behavior that can improve overall health.

A blood pressure screening at your dentist's office is just too good an opportunity to pass up, as your new dentist fortunately knows.

Sincerely,
Wayne W. Herman, DDS, MS

ABOUT THE AUTHOR

Wayne W. Herman, DDS, MS

Dr. Herman received his DDS from Indiana University in 1967, and his MS in oral medicine from the University of Iowa in 1974. He is a Diplomate of the Board of Oral Medicine, Past President of the American Academy of Oral Medicine, and has lectured and written extensively on the dental management of medically complex patients. He is currently Professor of Oral Medicine, Department of Oral Health & Diagnostic Sciences, College of Dental Medicine — Georgia Health Sciences University, Augusta, GA.

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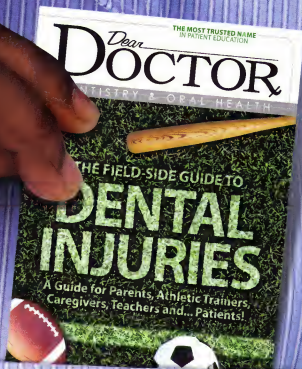
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